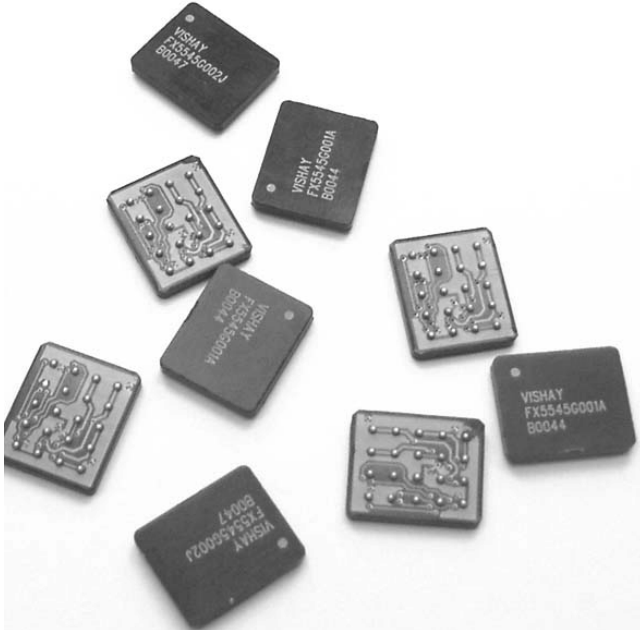




# Industry Smallest and Low Profile 3W 1000mA DC/DC Buck Converter with High Output Power Density



## FEATURES

- Fully integrated DC/DC converter
- High efficiency over large load range
- 2MHz switching frequency
- 100% duty cycle
- Power density - more than 100W/inch<sup>3</sup>
- 1µA shutdown current
- 2.7V to 6V input range (1Li+ and 3-cell NiCd or NiMH cells)
- 1.35V to 4.5V\*\* output voltage
- Programmable PWM/ $\overline{\text{PSM}}$  controls
- Low output ripple
- BGA/LGA construction
- Temperature range: - 40°C to + 85°C
- No external components needed
- Output power 3W
- Maximum current 1.0A
- Low profile
- UL recognized component E250930



\*\* Note: For higher output voltage please consult factory at [FunctionPAK@Vishay.com](mailto:FunctionPAK@Vishay.com)

The DC/DC converter provides fully integrated synchronous buck converter solution for the latest one-cell lithium ion cellular phones. Its input voltage is between 2.7V to 6V, capable of delivering up to 1000mA of output current at 1.5V to 3.6V.

The DC/DC converter combines the 2MHz-switching controller with fully integrated passive components needed to deliver the smallest and most efficient converter available today. The high switching frequency minimizes the output capacitance with peak to peak output ripple as low as 25mV. The DC/DC converter delivers efficiency up to 95%.

The programmable pulse-skipping mode ( $\overline{\text{PSM}}$ ) maintains this efficiency even during the standby and idle modes to increase overall battery life and talktime. In order to extract the last ounce of power from the battery, the DC/DC converter is designed with 100% duty cycle control for this mode. This function enables the DC/DC converter to operate like a saturated linear regulator delivering the highest potential output voltage for longer talk time.

The DC/DC converter is available in 20-ports BGA package. In order to satisfy the stringent ambient temperature requirements, the DC/DC converter is designed to handle the industrial temperature range of - 40°C to + 85°C.

## APPLICATION

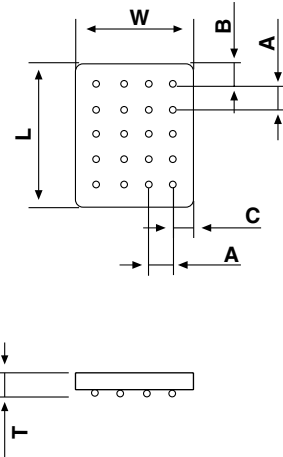
- Point of Load (POL) applications such as drivers for FPGA's, microprocessors, DSP's amplifiers, etc.
- Cordless phones, PDAs and others
- Supply voltage source for low-voltage chip sets
- Portable computers
- Battery back-up supplies
- Cameras
- Routers
- Fiber optics
- LANS
- Image processing

## ORDERING INFORMATION

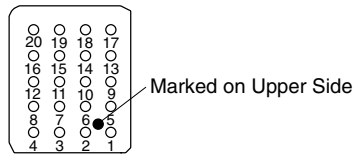
	FX	5545	G201	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FUNCTION										
SIZE										
CIRCUIT IDENTIFIER										
OUTPUT VOLTAGE - Output Voltage-Example: 2.7V should be written as 2V7 as the V indicates the decimal point, or ADJ for adjustable version - self selectable output voltage.										
PACKAGING - B1 = 10pcs in bulk; B5 = 50pcs in bulk; T1 = 13" reel; T2 = 7" reel.										
For lead (Pb)-free solder please add E2 suffix. Leave blank for regular SnPb.										

\* Pb containing terminations are not RoHS compliant, exemptions may apply

DIMENSIONS in inches [millimeters]	
L	0.58 ± 0.01 [14.7 ± 0.25]
W	0.48 ± 0.01 [12.2 ± 0.25]
A	0.1 ± 0.01 [2.54 ± 0.25]
B	0.09 ± 0.01 [2.29 ± 0.25]
C	0.09 ± 0.01 [2.27 ± 0.25]
T	0.12 max [3 max]
Ball Diameter	0.03 ± 0.001 [0.762 ± 0.025]



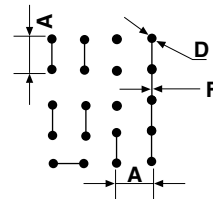
**BOTTOM SIDE**



\*Note: Pin Description application note is available at [www.vishay.com/doc?10119](http://www.vishay.com/doc?10119)

PIN CONFIGURATION*	
PIN	CONNECTION
1, 2	$\overline{SD}$
3, 7	SYNC
4, 8	N/C
5, 9	Vin
6, 10	PWM/PSM
11, 12	N/C
13, 17	GND
14, 18	Vout
15, 19	N/C
16, 20	GND

RECOMMENDED PAD PATTERN in inches [millimeters]		
A	D	F
0.1 ± 0.01 [2.54 ± 0.25]	0.03 ± 0.001 [0.8 ± 0.02]	0.02 ± 0.001 [0.5 ± 0.02]



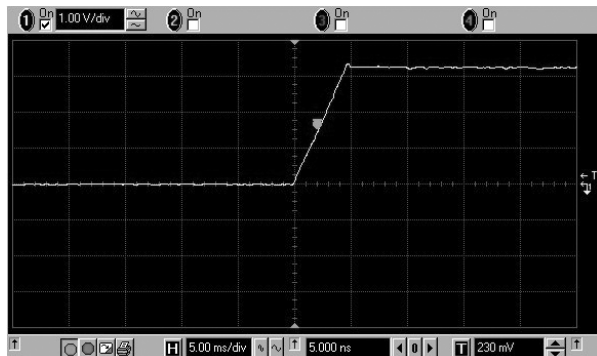
TAPE AND REEL
See Tape and Reel Information - Type B



STANDARD ELECTRICAL SPECIFICATIONS					
PARAMETER	UNIT	CONDITION	MIN	TYP	MAX
<b>Input</b>					
Voltage Range	V <sub>DC</sub>		2.7		6
Quiescent Current	μA	$\overline{\text{PSM}}$ mode		200	
Soft Start Time	ms	T <sub>SS</sub>		5	
<b>SD, PWM/<math>\overline{\text{PSM}}</math>, SYNC</b>					
Logic High	V	V <sub>H</sub>	2.4		
Logic Low	V	V <sub>L</sub>			0.8
Normal Mode	μA	I <sub>DD</sub>			750
$\overline{\text{PSM}}$ Mode	μA	I <sub>DD</sub>			250
Shutdown Mode	μA	I <sub>DD</sub>			1
Shutdown Time	ms	T <sub>SS</sub>		9	
<b>Insulation</b>					
Test Voltage	V <sub>AC</sub>	60Hz 60sec	750		
Resistance	Ω	V <sub>ISO</sub> = 500 V <sub>DC</sub>	1 x 10 <sup>11</sup>		
Leakage Current	nA	V <sub>ISO</sub> = 500 V <sub>DC</sub>			5
<b>Output</b>					
Power	W			3	
Voltage	V <sub>DC</sub>			1.35 to 4.5	
Voltage Tolerance	%	at 25 °C Ambient Temperature	- 3		3
Temp. Coefficient	%/°C				0.03
Ripple and Noise	mVpp	DC to 20 MHz		35	
<b>General</b>					
Package Weight	gr.				1.3
<b>Oscillator</b>					
Frequency	MHz			2	
SYNC Range		F <sub>SYNC</sub> /F <sub>OSC</sub>	1.2		1.5
<b>Temperature</b>					
Operation	°C		- 40		+ 85
Storage	°C		- 55		+ 125
Operating Junction Temp.	°C	T <sub>J</sub>		150	
Thermal Impedance	°C/W <sub>D</sub> *	θ <sub>JA</sub>		82	

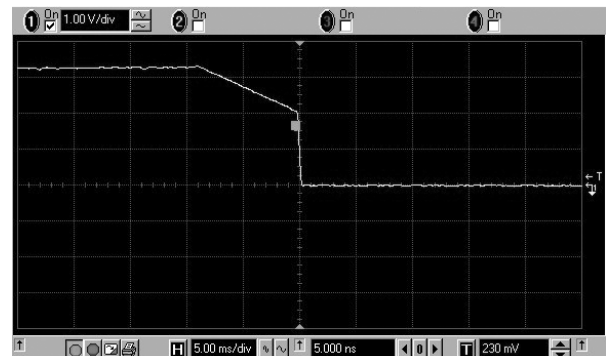
\*Note: W<sub>D</sub> = Power Dissipated

Rise Time



Rise Time (PWM mode): Vin = 6V; Vout = 3.3V; Iout = 1A

Fall Time



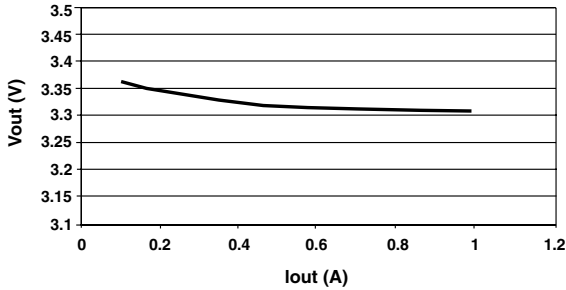
Fall Time (PWM mode): Vin = 6V; Vout = 3.3V; Iout = 1A



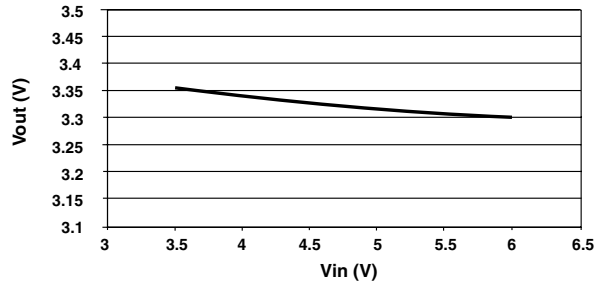
Vishay

**PWM MODE**

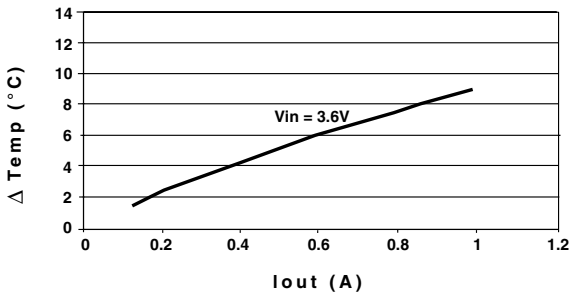
**Vout Vs. Iout\***  
Vin = 3.6V



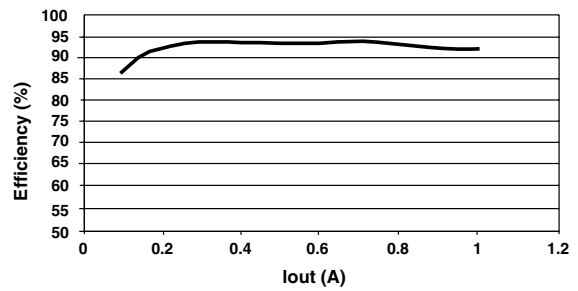
**Vout Vs. Vin\***  
Iout = 600mA



**Δ Temp. Vs. Iout\***  
Above 25°C Ambient Temperature

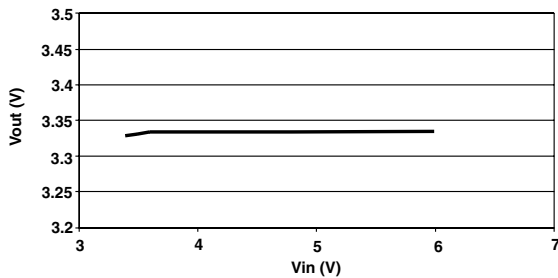


**Efficiency Vs. Iout\***  
Vin = 3.6V; Vin = 3.3V

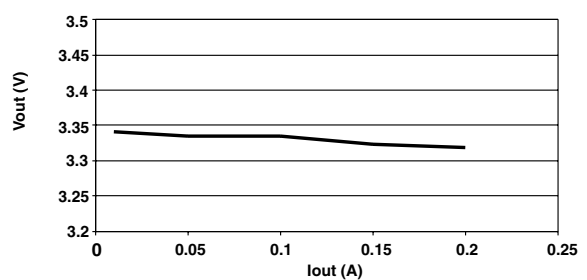


**PSM MODE**

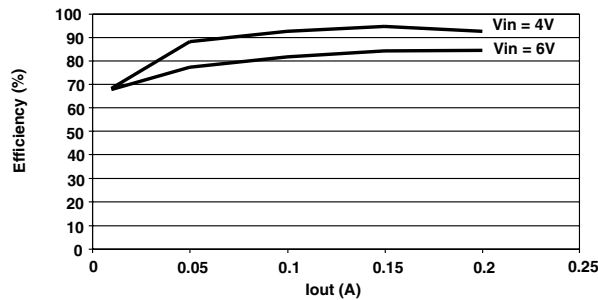
**Vout Vs. Vin\***  
Iout = 0.05A



**Vout Vs. Iout\***  
Vin = 6V



**Efficiency Vs. Iout\***



\*Note: Measurements were taken with Power supply: ZUP 20-40 from Nemic Lambda; Electronic load: 6063B from Agilent; Multimeter: Fluke 45 from Fluke and 34401 digital multimeter from Agilent; Scope: Infiniium 54815A from Agilent.



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